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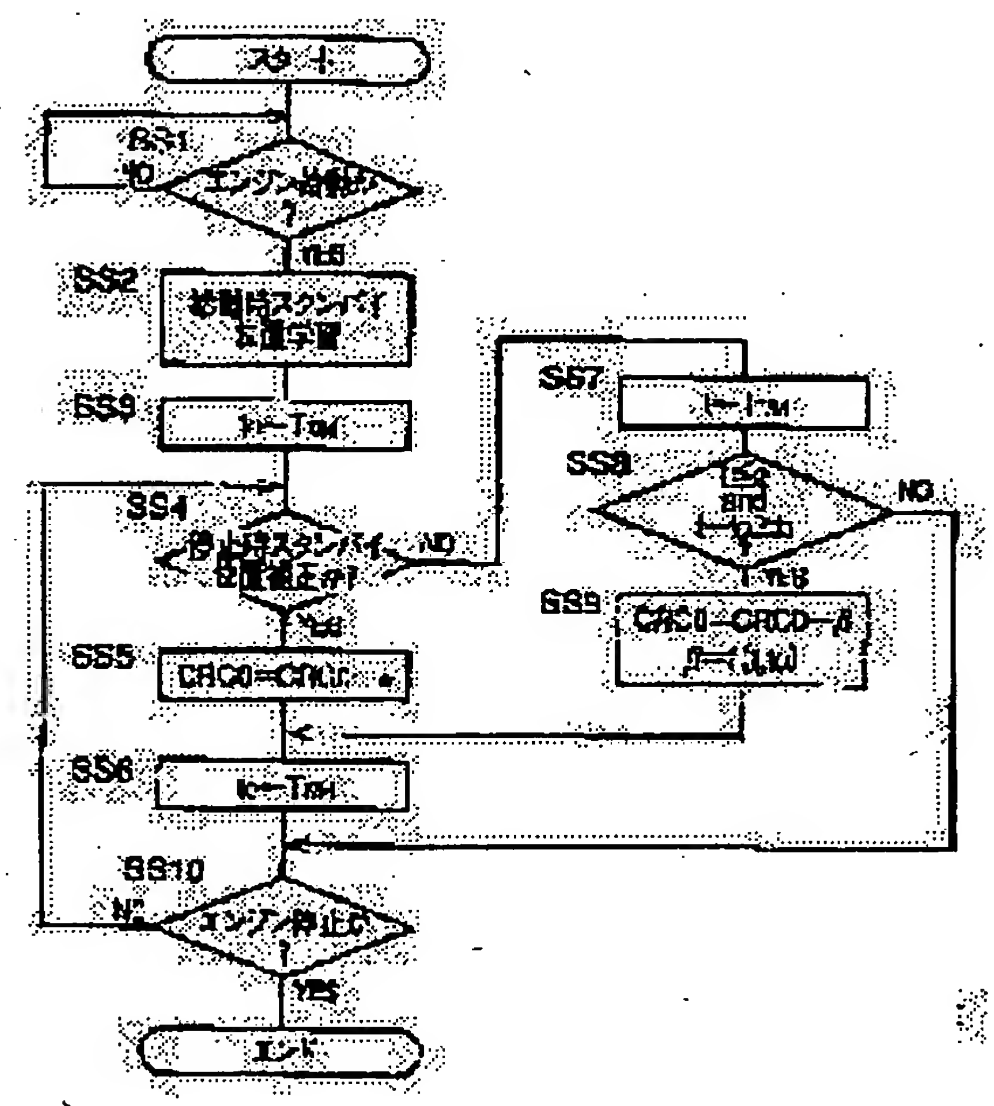
(54) AUTOMATIC CLUTCH CONTROL DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To establish a proper standby condition irrespective of varying temp. of a lubricating oil in a transmission.
SOLUTION: The standby position CRCO is set on the basis of the input shaft revolving speed of a transmission (SS2) while the transmitted torque of an automatic clutch is changed immediately after the start of an engine, and the T/M oil temp. TT/M at this time is put in memory as the reference temp. t0 (SS3). To prevent the input shaft revolving speed in the standby condition from becoming excessive resulting from a drop of the lubricating oil viscosity associated with a temp. rise, the standby position CRCO is corrected bit by bit so that the transmitted torque of the automatic clutch lessens (SS8 and SS9) when the T/M oil temp. TT/M (=current temp. t) is ultra-low not more than the specified value (a) and the temp. change (t-t0) is not less than specified value (b).



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CLAIMS

[Claim(s)]
[Claim 1] The automatic clutch arranged between this change gear and this driving source for a run at the time of gear change of the change gear arranged between the driving source for a run, and the wheel In the automatic clutch control unit held in the standby state where slight torque transmission is performed in the range which does not spoil gear change of this change gear It is based on the predetermined physical quantity which participates in the rotational resistance of the aforementioned change gear and which was defined beforehand. The automatic clutch control unit characterized by having a standby state determination means to determine this standby state that the transfer torque of the aforementioned automatic clutch in the aforementioned standby state will become small with the fall of this rotational resistance.
[Claim 2] The automatic clutch control unit according to claim 1 characterized by providing the following. The aforementioned standby state determination means is a standby state setting means by which are at the operation time of the aforementioned driving source for a run, and are at the vehicles halt time, and the aforementioned change gear sets up the aforementioned standby state based on the input-shaft rotational frequency of this change gear at the time of a neutral while changing the transfer torque of the aforementioned automatic clutch. An oil-temperature storage means to memorize the lubricous oil temperature of the aforementioned change gear when the aforementioned standby state is set up by this standby state setting means as a reference temperature It is an amendment standby state amendment means about this standby state so that the lubricous oil temperature of the aforementioned change gear may be detected serially and the transfer torque of the aforementioned automatic clutch in the aforementioned standby state may become small with elevation of this lubricous oil temperature based on this lubricous oil temperature and the aforementioned reference temperature.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to an automatic clutch control unit, and relates to improvement of an automatic clutch control unit which holds automatic clutch in the standby state especially at the time of gear change of a change gear.
[0002]
[Description of the Prior Art] While intercepting the automatic clutch arranged between the change gear and the driving source for a run at the time of gear change of the change gear arranged between the driving source for a run, and the wheel, the automatic clutch control unit connected after a gear change end is known. Equipment given in JP,1-233127,A is the example, and it is held in the standby state in front of connection at the time of automatic clutch interception in order to perform promptly connection control of the automatic clutch after gear change.
[0003]
[Problem(s) to be Solved by the Invention] It is about a setup of the above-mentioned standby state at the operation time of for example, the driving source for a run, and is at the vehicles halt time. a change gear by the way, at the time of a neutral If slight torque transmission is made to be performed in the range in which it will not spoil gear change of a change gear if the input-shaft rotational frequency of a change gear puts in another way predetermined within the limits of super-low rotation, changing the transfer torque of automatic clutch Irrespective of individual differences, aging, etc., a fixed standby state is acquired and it becomes possible to perform connection control of automatic clutch in a quick and high precision.
[0004] However, a setup of the above-mentioned standby state is for example, immediately after engine starting. That it is at the -20 degrees C - about -30 degrees C or less very-low-temperature time And since the viscosity of the lubricating oil of the gear change inside of a plane is high and the rotational resistance of an input shaft is large, If the lubricous oil temperature of the gear change inside of a plane becomes high with stirring, the frictional heat of a speed change gear, etc. with a vehicles run and the viscosity of a lubricating oil falls in connection with it while it will be in a comparatively big torque-transmission state, a standby state The rotational resistance of an input shaft may fall, the input-shaft rotational frequency in the standby state at the time of gear change may become high, and poor gear change may be produced.
[0005] The place which succeeded in this invention against the background of the above situation, and is made into the purpose is irrespective of the temperature change of the lubricating oil of the gear change inside of a plane to acquire a proper standby state.
[0006]
[Means for Solving the Problem] In order to attain this purpose, the 1st invention at the time of gear change of the change gear arranged between the driving source for a run, and the wheel In the automatic clutch control unit which holds the automatic clutch arranged between the change gear and the driving source for a run in the standby state where slight torque transmission is performed in the range which does not spoil gear change of the change gear It is based on the

predetermined physical quantity which participates in the rotational resistance of the aforementioned change gear and which was defined beforehand. It is characterized by having a standby state determination means to determine the standby state that the transfer torque of the aforementioned automatic clutch in the aforementioned standby state will become small with the fall of the rotational resistance.

[0007] The 2nd invention is set to the automatic clutch control unit of the 1st invention of the above. the aforementioned standby state determination means (a) It is at the operation time of the aforementioned driving source for a run, and is at the vehicles halt time. the aforementioned change gear at the time of a neutral A standby state setting means to set up the aforementioned standby state based on the input-shaft rotational frequency of the change gear while changing the transfer torque of the aforementioned automatic clutch, (b) An oil-temperature storage means to memorize the lubricous oil temperature of the aforementioned change gear when the aforementioned standby state is set up by the standby state setting means as a reference temperature, (c) Detect the lubricous oil temperature of the aforementioned change gear serially, and it is based on the lubricous oil temperature and the aforementioned reference temperature. It is characterized by having an amendment standby state amendment means for the standby state so that the transfer torque of the aforementioned automatic clutch in the aforementioned standby state may become small with elevation of the lubricous oil temperature. In addition, the lubricous oil temperature of a change gear is equivalent to the predetermined physical quantity which participates in the rotational resistance of a change gear according to claim 1 and which was defined beforehand.

[0008]

[Effect of the Invention] In such an automatic clutch control unit, since a standby state is determined that the transfer torque of automatic clutch will become small with the fall of the rotational resistance of a change gear, the poor gear change to which it is suppressed to which that originate in the fall of the rotational resistance accompanying elevation of a lubricous oil temperature, and the input-shaft rotational frequency or torque of a change gear in a standby state goes up, and it originates in elevation of an input-shaft rotational frequency or torque is prevented.

[0009] It is possible to be at the operation time of the driving source for a run, and to be at the vehicles halt time, and for a standby state fixed irrespective of a difference of environment, such as temperature, individual differences, aging, etc. to be acquired in the 2nd invention, since a standby state is set up based on an input-shaft rotational frequency while a change gear changes the transfer torque of automatic clutch at the time of a neutral, and to perform connection control of automatic clutch in a quick and high precision. A standby state so that the lubricous oil temperature at the time of the setup may be memorized as a reference temperature and transfer torque may become small with elevation of an actual lubricous oil temperature And an amendment sake, Even if it originates in the viscous fall of the lubricating oil accompanying elevation of a lubricous oil temperature and the rotational resistance of the input shaft of a change gear falls, the poor gear change to which it is suppressed to which that the input-shaft rotational frequency or torque in a standby state goes up, and it originates in elevation of an input-shaft rotational frequency or torque is prevented.

[0010]

[Embodiments of the Invention] While two or more gear change gear pairs from which a change gear ratio differs are arranged between biaxial [parallel] as the above-mentioned change gear here, the thing of the biaxial engagement formula in which two or more claw clutches were prepared corresponding to gear change gear pairs, such as it, is used suitably, and various change gears, such as a change gear which switches the change gear which has two or more advance gear ratios, the change gear which switches order ** or the neutral which intercepts power transfer, an advance gear ratio, or a go-astern gear ratio, are used. Moreover, a switch etc. may detect what switches a gear ratio automatically with a gear change actuator, of course according to the gear change map defined beforehand when a gear ratio is mechanically switched according to shift-lever operation of an operator, and an operator's gear change intention, and a gear ratio may be switched according to the gear change intention.

[0011] As automatic clutch, a friction engagement formula clutch, a magnetic-powder formula electromagnetic clutch, etc. are used suitably, and slip control can also be performed if needed. A friction engagement formula clutch is constituted so that it may be opened by making a release sleeve slide by the clutch release cylinder (interception), while carrying out friction engagement according to the energization force of springs, such as a diaphragm spring, and the stroke position of a clutch release cylinder, the position of a release sleeve, etc. can prescribe a standby state. A magnetic-powder formula electromagnetic clutch can specify a standby state with electromagnetic force.
[0012] As predetermined physical quantity which participates in the rotational resistance of a change gear, it is appropriate to use the temperature of the lubricating oil of the gear change inside of a plane, for example like the 2nd invention. Although direct detection of the lubricous oil temperature can also be carried out by the oil-temperature sensor, it can substitute for engine-coolant water temperature or OATs (inhalation air temperature etc.) as a lubricous oil temperature, or it can also presume a lubricous oil temperature from mileage, the rotational frequency of a change gear, torque, etc. during the operation of driving sources for a run, such as an engine.
[0013] Although a change gear has the neutral and advance gear ratio, or go-astern gear ratio which intercepts power transfer at least and consists of the 2nd invention, on the occasion of implementation of the 1st invention, it is not necessary to necessarily have the neutral. Moreover, although the standby state setting means of the 2nd invention sets up a standby state based on the input-shaft rotational frequency of a change gear, the standby state determination means of the 1st invention may determine a standby state by a data map, operation expression, etc. to which the lubricous oil temperature (predetermined physical quantity which participates in the rotational resistance of a change gear) etc. was beforehand set as a parameter. It is also possible to set up two or more standby states according to the kind of gear change etc.
[0014] Although it sets up a standby state only at the time of starting of the engine as for example, a driving source for a run, the standby state setting means of the 2nd invention has the desirable thing which re(it updates) set up a standby state one by one and which is made like, when satisfying the setups it is at the operation time of the driving source for a run, and is at the vehicles halt time, and is whose change gear at the neutral time. based on reference temperature when a standby state is always set up by the standby state setting means, although an amendment thing is sufficient as a standby state amendment means in a standby state, it rewrites reference temperature one by one by the lubricous oil temperature when amending a standby state (it updates) — you may make it like
[0015] Hereafter, the example of this invention is explained in detail, referring to a drawing. Drawing 1 is a main point view explaining the outline composition of the driving gear 10 for vehicles with which this invention was applied, is for FF (front engine front drive) vehicles, and is equipped with the engine 12 as a driving source for a run, automatic clutch 14, the change gear 16, and the differential gear mechanism 18. Automatic clutch 14 is a friction clutch of a dry type veneer formula shown in drawing 3 . The flywheel 22 attached in the crankshaft 20 of an engine 12, the clutch disc 26 arranged by the clutch output shaft 24, the pressure plate 30 arranged in the clutch housing 28, and a pressure plate 30 When being moved leftward [of drawing] through the release fork 36 by the diaphragm spring 32 and clutch release cylinder 34 which compress a clutch disc 26 and carry out power transfer by energizing to a flywheel 22 side It has the release sleeve 38 which is made to carry out the variation rate of the toe of a diaphragm spring 32 leftward [of drawing], and opens a clutch (interception), and is constituted. It connects with the hydraulic circuit which has the hydraulic pump 94 shown in drawing 5 , and the clutch solenoid valve 98, and a clutch release cylinder 34 is oil pressure PO. An operating state is controlled by control or the change of a circuit.
[0016] A change gear 16 is arranged in the common housing 40 with a differential gear mechanism 18, constitutes the transformer axle, and is flooded with the lubricating oil to which it filled up only with the specified quantity in the housing 40, and lubrication is carried out with a differential gear mechanism 18 as concretely shown in drawing 2 . A change gear 16 is (a). While two or more gear change gear pair 46a-46e from which gear ratio differs is arranged between the

input shaft 42 of an parallel couple, and an output shaft 44 The gear change mechanism of a biaxial engagement formula in which two or more claw clutches 48a-48e were formed corresponding to gear change gear pair 46a-46e, such as it (b) three clutches of the claw clutches 48a-48e, such as it, — a hub — it has the shift selection shaft 52 which is made to move alternatively any of Sleeves 50a, 50b, and 50c they are, and switches a gear ratio, and the gear ratio of five steps of advance is formed A go-astern gear ratio is formed by being meshed with the idle wheel for go-astern which go-astern gear pair 54 was arranged by the input shaft 42 and the output shaft 44, and was arranged by the counter shaft which is not illustrated. In addition, the output gearing 56 is arranged by the output shaft 44, and the input shaft 42 is meshed with the starter ring 58 of a differential gear mechanism 18 while it is connected with the clutch output shaft 24 of the aforementioned automatic clutch 14 by the spline fitting 55. Drawing 2 is the cross section showing the concrete composition of the above-mentioned change gear 16 and a differential gear mechanism 18, and is the development with which drawing 1 and drawing 2 showed the axial center of an input shaft 42, an output shaft 44, and a starter ring 58 in the common flat surface.

[0017] the above-mentioned claw clutches 48a-48e are all synchromesh types, and illustrate concretely about claw clutch 48a to drawing 4 — as — the key spring 60 — a clutch — a hub — it has the shifting key 62 made to engage with sleeve 50a, the synchronizer ring 64 rotated with the shifting key 62 in the state of having predetermined play, and the cone section 68 prepared for the input gearing 66 of gear change gear pair 46a The spline gear tooth 70 is formed in the inner skin of sleeve 50a, and spline fitting is carried out with an input shaft 42. a clutch — a hub — it is made to rotate always in one with an input shaft 42 — having — coming — **** — the clutch — a hub, if sleeve 50a is moved rightward [of drawing] The synchronizer ring 64 is pressed by the cone section 68, and is made to carry out taper fitting through the shifting key 62, and power transfer comes to be performed on the input gearing 66 by friction between them etc. a clutch — a hub — if sleeve 50a is moved further rightward, the spline gear tooth 70 will be meshed with the spline gear tooth 72 formed in the synchronizer ring 64, and the spline gear tooth 74 further prepared for the input gearing 66, an input shaft 42 and the input gearing 66 will be connected in one by this, and power transfer will be performed through gear change gear pair 46a (a) of drawing 4 (b) It is in the state where claw clutch 48a was intercepted, and is (c) of drawing 4 . (d) It is in the state where claw clutch 48a was connected. in addition, (a) of drawing 4 (c) the cross section of one flat surface containing an axial center — it is — (b) (d) (a) (c) the clutch which looked at the state from the periphery side — a hub — it is a development except a part for the body of sleeve 50a

[0018] although other claw clutches 48b-48e are the same composition as substantially as the above-mentioned claw clutch 48a — a clutch — a hub — sleeve 50b — a thing common to claw clutches 48b and 48c — it is — a clutch — a hub — sleeve 50c is common to claw clutches 48d and 48e

[0019] the selection cylinder which the shift selection shaft 52 is arranged possible [the rotatable of the circumference of an axial center, and movement of shaft orientations], and is not illustrated — three positions of the circumference of an axial center, i.e., the aforementioned clutch, — a hub — the 1st selection position in which sleeve 50c and engagement are possible, and a clutch — a hub — the 2nd selection position in which sleeve 50b and engagement are possible, and a clutch — a hub — it is positioned in the 3rd selection the [moreover, / the center valve position (state of drawing 1) of the center where three positions 48a-48e of shaft orientations, i.e. claw clutches, are all intercepted by the shift cylinder, and a go-astern gear ratio is not materialized, either, the 1st shift position (right-hand side of drawing 1) of the both sides in the shaft orientations, and] — it is positioned by 2 shift positions (left-hand side of drawing 1) The above-mentioned selection cylinder and a shift cylinder are the oil pressure PO it is equivalent to a gear change actuator, connect with the aforementioned clutch release cylinder 34 and a common hydraulic circuit, and according to the aforementioned hydraulic pump 94. An operating state is controlled by control or the change of the circuit by the selection solenoid valve 102 and the shift solenoid valve 104 (refer to drawing 5), respectively.

[0020] At the 1st shift position of the above-mentioned 1st selection position, by connecting

claw clutch 48e, a change gear ratio e (the rotational frequency NOUT of rotational frequency NIN / output shaft 44 of the = input shaft 42) is formed for the 1st largest gear ratio, and a change gear ratio e is formed by the 2nd for the 2nd large gear ratio by connecting 48d of claw clutches in the 2nd shift position of the 1st selection position. At the 1st shift position of the 2nd selection position, by connecting claw clutch 48c, a change gear ratio e is formed by the 3rd for the 3rd large gear ratio, and a change gear ratio e is formed by the 4th for the 4th large gear ratio by connecting claw clutch 48b in the 2nd shift position of the 2nd selection position. The change gear ratio e of this 4th gear ratio is abbreviation 1. By connecting claw clutch 48a in the 1st shift position of the 3rd selection position, a change gear ratio e is formed for the 5th smallest gear ratio, and a go-astern gear ratio is formed in the 2nd shift position of the 3rd selection position.
[0021] The aforementioned differential gear mechanism 18 is the thing of a bevel-gear formula, and drive shafts 82R and 82L are connected with the side gears 80R and 80L of a couple by spline fitting etc., respectively, and it carries out the rotation drive of the front wheels (driving wheel) 84R and 84L on either side.
[0022] Drawing 5 is a block diagram explaining the control system of the driving gear 10 for vehicles of this example, and it exchanges required information between them etc. while it is equipped with ECU114 for engines (Electronic Control Unit), ECU116 for change gears, and ECU118 for ABS (Antilock Brake System). ECUs 114, 116, and 118, such as this, are constituted by each including the microcomputer, and they perform signal processing to ROM according to the program memorized beforehand, using the temporary storage function of RAM. In ECU114 for engines The ignition switch 120, an engine speed () [NE] A sensor 122, the vehicle speed (V) sensor 124, the throttle-valve opening (thetaTH) sensor 126, the inhalation air-content (Q) sensor 128, an inhalation sky atmospheric temperature (TA) sensor 130, the engine-cooling-water ** (TW) sensor 132, etc. are connected. Respectively The actuated valve position of the ignition switch 120, and an engine speed NE, The vehicle speed V (it corresponds to the rotational frequency NOUT of an output shaft 44), throttle-valve opening thetaTH, the inhalation air content Q, inhalation sky atmospheric temperature (outside air temperature) TA, and engine-cooling-water ** TW The signal to express is supplied. etc. — According to signals, such as it, the rotation drive of the starter (electrical motor) 134 is carried out, put an engine 12 into operation, the fuel oil consumption and fuel injection timing of a fuel injection valve 136 are controlled, or ignition timing of an ignition plug is controlled by the ignitor 138.
[0023] In ECU116 for change gears The lever position (PL) sensor 140, the brake switch 144, the input-shaft rotational frequency (NIN : rotational frequency of input shaft 42) sensor 146, the gear position (PG) sensor 148, the clutch stroke (SCL) sensor 150, oil pressure () [PO] A sensor 110, the T/M oil-temperature (TT/M) sensor 158, etc. are connected. The lever position PL which is the actuated valve position of a shift lever 160 (refer to drawing 6), respectively The gear position PG which is the gear ratio of ON of a brake, OFF, the input-shaft rotational frequency NIN, and a change gear 16 The stroke SCL of automatic clutch 14, i.e., the stroke of a clutch release cylinder 34, The signal showing the oil pressure PO of the hydraulic circuit which operates the clutch release cylinder 34 and selection cylinder, and a shift cylinder, an T/M oil temperature (temperature of the lubricating oil in a change gear 16), etc. is supplied. And by incorporating a required signal from signals, such as it, and aforementioned ECU114 for engine control and ECU118 for ABS By controlling the operation of a hydraulic pump 94 prepared in the above-mentioned hydraulic circuit, or switching and controlling the clutch solenoid valve 98, the selection solenoid valve 102, and the shift solenoid valve 104 While switching the operating state of a selection cylinder and a shift cylinder and performing gear change control (pre-go-astern change control is included) of a change gear 16, corresponding to the gear change, a clutch release cylinder 34 performs interception of automatic clutch 14, and connection control.
[0024] Engine-cooling-water ** TW at the time of starting of an engine 12 instead of forming the above-mentioned T/M oil-temperature sensor 158 Inhalation sky atmospheric temperature TA While reading Generation of heat by engagement friction of subsequent gear change gear pair 46a-46e or a differential gear mechanism 18, It is T/M oil-temperature TT/M by computing elevation of the degree of lubricous oil temperature by stirring etc. from operation expression, a

data map, etc. which make a parameter mileage, torque, a rotational frequency of a change gear 16, etc. Presuming is also possible.

[0025] As the aforementioned shift lever 160 is arranged beside the driver's seat and it is shown in drawing 6 , "R (reverse)", While selection operation is carried out and positioning maintenance is carried out at three actuated valve positions of "N (neutral)", "D (drive)", and "S(sequential)" **, in the "S" position It is operated in the "(+)" position and "(-)" position which were established in the cross direction of vehicles, and the lever position sensor 140 detects the actuated valve position (lever position) with two or more ON-OFF switches arranged for example, in each actuated valve position. And if a shift lever 160 is operated in the "R" position, a change gear 16 will be switched to a go-astern gear ratio, and if operated in the "N" position, it will be switched to a power transfer cut off state (neutral).

[0026] Moreover, if a shift lever 160 is operated in the "D" position, it will become automatic gear change mode, and according to the gear change map to which operational status, such as throttle-valve opening thetaTH and the vehicle speed V, was beforehand set as a parameter, two or more advance gear ratios of a change gear 16 are switched automatically. "— S — " — a position — plurality — advance — a gear ratio — an operator — gear change — an intention — manual operation — changing — a manual — a shift — the mode — it is — "— (— + —) — " — a position — or — "— (-) — " — a position — a shift lever — 160 — operating it — having — if — a change gear — 16 — plurality — advance — a gear ratio — fluctuating — having . "(+)" position is a rise position, while, as for a gear ratio, Rise e, i.e., a change gear ratio, changes gears one step at a time to a small high-speed stage side for every one operation, a "(-)" position is a down position and, as for a gear ratio, Down e, i.e., a change gear ratio, changes gears one step at a time to a large low-speed stage side for every one operation.

[0027] Between the "D" position and the "S" position, a moderation mechanism is established between the "N" position and the "D" position between the above-mentioned "R" position and the "N" position, respectively, and when the mountain of a required operating physical force is given by energization equipment, cams, etc., such as a spring, a feeling of moderation is given to shift-lever operation. moreover — "— S — " — a position — order — preparing — having had — "— (— + —) — " — a position — "— (— - —) — " — a position — each — unstable — it — etc. etc. — "— (— + —) — " — a position — "— (— - —) — " — a position — operating it — having had — a shift lever — 160 — a spring — etc. etc. — energization — equipment —

[0028] The wheel speed (NW) sensor 152 arranged in aforementioned ECU118 for ABS by four wheels in drawing 5 , respectively to wheel speed NW The signal to express is supplied and they are the wheel speed NW, such as it. By comparing, the existence of a slip is detected and generating of a slip is suppressed by controlling the brake hydraulic control valve 154 and controlling the brake oil pressure of each wheel.

[0029] Next, interception of the automatic clutch 14 by aforementioned ECU116 for change gears and connection control are explained concretely. ECU116 for change gears is functionally equipped with the automatic clutch intermittence means 162 and the standby positioning means 164, as shown in drawing 7 , and while the automatic clutch intermittence means 162 performs signal processing according to the flow chart of drawing 8 , the standby positioning means 164 perform signal processing according to the flow chart of drawing 9 . The standby positioning means 164 are equivalent to a standby state determination means.

[0030] First, at Step S1 of drawing 8 , when it judges whether the gear change instructions for switching the gear ratio (a go-astern gear ratio being included) of a change gear 16 were outputted and gear change instructions are outputted, automatic clutch 14 is intercepted at Step S2, and it holds in the standby state. This standby state is in the state where the clutch release cylinder 34 was held in the standby position, and a standby position is determined by the standby positioning means 164 according to the flow chart of drawing 9 . At Step S3, if it is at the signal supplied from the gear position sensor 148, and the run time, based on the rotational frequency ratio (NIN/NOUT) of the I/O shafts 42 and 44 etc., it will judge whether gear change was completed, and if gear change is completed, automatic clutch 14 will be connected by step S4. When the spline gear tooth 70 gears with the spline gear tooth 74 based on the shift amount of the aforementioned shift selection shaft 52, the sensor containing a gear by which ON and

OFF are switched in a predetermined position is arranged, and you may make it ON of the sensor containing a gear and OFF detect the completion of gear change independently [the gear position sensor 148]. Moreover, connection of interception of the automatic clutch 14 in the above-mentioned step S2 and the automatic clutch 14 in step S4 is made to the predetermined timing beforehand defined by the data map etc. according to gear change conditions, such as a kind of gear change, and the vehicle speed.
[0031] In the step SS 1 of the flow chart of drawing 9 which determines a standby position, when for example, engine control is started by the engine 12 for whether the engine 12 was started judging from various kinds of signals to perform, a standby position is learned at a step SS 2. Setting range NIN* predetermined [after checking that a change gear 16 is in a neutral state, for example in the vehicle speed V= 0 at a step SS 2, move the release sleeve 38 by the clutch release cylinder 34, change the engagement state (transfer torque) of automatic clutch 14, and /, such as dozens rpm,] in the input-shaft rotational frequency NIN The clutch stroke SCL when being satisfied is read from the clutch stroke sensor 150, and it is set as the standby position CRC 0. By this example, this standby position CRC 0 is set up considering the clutch stroke SCL when the piston of a clutch release cylinder 34 projecting and being located by the edge as a criteria position, when automatic clutch 14 is a perfect cut off state. Although it can also ask for a standby position in process in which automatic clutch 14 is connected by the clutch release cylinder 34 when automatic clutch 14 is made into a cut off state at the time of engine starting, various modes — you may make it ask for a standby position in the process intercepted once carrying out full engagement of the automatic clutch 14 etc. — are employable. Moreover, the input-shaft rotational frequency NIN is an engine speed NE. It makes for an engine 12 to be an idle state in order to change into the execution condition of a step SS 2, or is an engine speed NE. It considers as a parameter and is above-mentioned setting range NIN*. It is desirable to make it set up. as an execution condition of a step SS 2, a brake or a parking brake is ON — etc. — other conditions can also be set up
[0032] At a step SS 3, it is T/M oil-temperature TT/M at that time. Reference temperature t0 It sets up. It judges whether it is satisfied [with a step SS 4] of standby position amendment conditions at the time of a halt, and although a step SS 5 is performed when satisfied, when not satisfied, seven or less step SS is performed. At the time of a halt, for standby position amendment conditions, when a clutch release cylinder 34 has a change gear 16 in a standby position in the neutral state by the vehicle speed V= 0 (when automatic clutch 14 is in a standby state), the input-shaft rotational frequency NIN is the predetermined upper limit NINmax. It is being above and is a upper limit NINmax. It is a value the same [as the upper limit of aforementioned setting range NIN*] or larger than it. Other conditions can also be set up also in this step SS 4, such as making for an engine 12 to be an idle state into amendment conditions. And since the input-shaft rotational frequency NIN in a standby state is too high when satisfying all the above-mentioned amendment conditions, only the predetermined value alpha which was able to define beforehand the standby position CRC 0 of a clutch release cylinder 34 at a step SS 5 is made small so that the input-shaft rotational frequency NIN may become low, and the transfer torque of automatic clutch 14 may specifically become low. Friction of automatic clutch 14 becomes small and transfer torque becomes small, so that the standby position CRC 0 becomes small. The predetermined value alpha is the input-shaft rotational frequency NIN and a upper limit NINmax, although you may be constant value. You may make it ask from operation expression or a data map according to a difference (NIN-NINmax). Moreover, it sets to the following step SS 6, and is T/M oil-temperature TT/M at that time. Reference temperature t0 It sets up (updating).
[0033] On the other hand, when not satisfying the amendment conditions of a step SS 4, it sets to the vehicles run middle class in which gear ratio, and it is T/M oil-temperature TT/M at that time at a step SS 7 first. It considers as the present temperature t, and the present temperature t is below the predetermined temperature a in the following step SS 8, and it is reference temperature t0. It judges whether a temperature gradient (t-t0) is beyond the predetermined value b. Although a step SS 10 is performed when not satisfying which conditions, in satisfying conditions, such as it, it amends the standby position CRC 0 at a step SS 9. The predetermined

temperature a is the temperature from which the viscosity of a lubricating oil will become abbreviation regularity, and the rotational resistance of a change gear 16 will hardly change, and a suitable constant temperature of −10 degrees C − about +10 degrees C within the limits is set up beforehand, corresponding to viscous − temperature-change property of the lubricating oil to be used etc. About the predetermined value b, it is T/M oil-temperature TT/M. The input-shaft rotational frequency (when a clutch release cylinder 34 is made into the standby position CRC 0) NIN when originating in change, and the viscosity of a lubricating oil changing, and making automatic clutch 14 into a standby state at the time of gear change is aforementioned setting range NIN*. It is the temperature gradient which it exceeds and a suitable constant temperature of 3 degrees C − about 5 degrees C is beforehand set up according to viscous − temperature-change property of the lubricating oil to be used etc. Depending on viscous-temperature-change property of a lubricating oil, it is reference temperature t0. The predetermined value b can be set up by making the present temperature t into a parameter.
[0034] And at a step SS 9, they are the present temperature t and reference temperature t0. The amount beta of amendments is calculated from the data map beforehand defined as a parameter, operation expression, etc., and only the amount beta of amendments amends the standby position CRC 0. the amount beta of amendments — T/M oil-temperature TT/M the input-shaft rotational frequency NIN in [irrespective of / the viscous fall of the lubricating oil accompanying a rise] a standby state — aforementioned setting range NIN* what makes transfer torque of automatic clutch 14 low so that it may not exceed — it is — T/M oil-temperature TT/M etc. — it considers as a parameter and is beforehand set by experiment etc. The present temperature t and reference temperature t0 You may make it calculate the amount beta of amendments by making a temperature gradient (t-t0) into a parameter. T/M oil-temperature TT/M It is equivalent to the predetermined physical quantity which participates in the rotational resistance of a change gear 16. Then, the aforementioned step SS 6 is performed and it is T/M oil-temperature TT/M at that time. Reference temperature t0 It sets up (updating).

[0035] At a step SS 10, it judges whether the engine 12 was stopped with various kinds of signals, a signal from the ignition switch 120, etc. which perform engine control, while an engine 12 is an operating state, four or less step SS is repeated and performed, and in the steps [SS / SS or / 9] 5, the standby position CRC 0 is updated serially.
[0036] In the automatic clutch control unit of such this example, since the standby position CRC 0 is set up based on the input-shaft rotational frequency NIN, changing the transfer torque of automatic clutch 14 in a step SS 2 immediately after starting of an engine 12, irrespective of a difference of environment, such as temperature, an individual difference, aging, etc., a fixed standby state is acquired and connection control of automatic clutch 14 can be performed in a quick and high precision. and T/M oil-temperature TT/M at the time of the setup Reference temperature t0 In Steps SS7-SS9 ******, while memorizing Actual T/M oil-temperature TT/M The standby position CRC 0 one by one so that transfer torque may become small with a rise Amendment sake, T/M oil-temperature TT/M Even if it originates in the viscous fall of the lubricating oil accompanying a rise and the rotational resistance of the input shaft 42 of a change gear 16 falls The poor gear change to which it is suppressed to which that the input-shaft rotational frequency NIN or torque in a standby state goes up, and it originates in the rise of the input-shaft rotational frequency NIN or torque is prevented.
[0037] moreover, the input-shaft rotational frequency [in / a standby state / in / Steps SS4 and SS5 / at this example / to the time of a vehicles halt] NIN — being based — the standby position CRC 0 — an amendment — since it is like, the standby position CRC 0 is amended in a higher precision
[0038] In this example, the portion which performs a step SS 2 among a series of signal processing by ECU116 for change gears is equivalent to a standby state setting means, the portion which performs a step SS 3 is equivalent to an oil-temperature storage means, and the portion which performs Steps SS7, SS8, and SS9 is equivalent to a standby state amendment means.
[0039] As mentioned above, although the example of this invention was explained in detail based

on the drawing, this is 1 operation form to the last, and this invention can be carried out in the mode which added various change and improvement based on this contractor's knowledge.

[Translation done.]